National Institute of Environmental Health Sciences

The impact of heat waves on mortality

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Abstract:

BACKGROUND: Heat waves have been linked with an increase in mortality, but the associated risk has been only partly characterized. METHODS: We examined this association by decomposing the risk for temperature into a "main effect" due to independent effects of daily high temperatures, and an "added" effect due to sustained duration of heat during waves, using data from 108 communities in the United States during 1987-2000. We adopted different definitions of heat-wave days on the basis of combinations of temperature thresholds and days of duration. The main effect was estimated through distributed lag nonlinear functions of temperature, which account for nonlinear delayed effects and short-time harvesting. We defined the main effect as the relative risk between the median city-specific temperature during heat-wave days and the 75th percentile of the year-round distribution. The added effect was defined first using a simple indicator, and then a function of consecutive heat-wave days. City-specific main and added effects were pooled through univariate and multivariate meta-analytic techniques. RESULTS: The added wave effect was small (0.2%-2.8% excess relative risk, depending on wave definition) compared with the main effect (4.9%-8.0%), and was apparent only after 4 consecutive heat-wave days. CONCLUSIONS: Most of the excess risk with heat waves in the United States can be simply summarized as the independent effects of individual days' temperatures. A smaller added effect arises in heat waves lasting more than 4 days.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location:

resource focuses on specific location

United States

Health Impact:

specification of health effect or disease related to climate change exposure

Morbidity/Mortality

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified